CHAPTER 3
DEMAND FOR REMEDIATION OF NATIONAL PRIORITIES LIST SITES

This chapter presents estimates of the number, location, size, characteristics, and cleanup costs of hazardous waste sites placed on the Superfund National Priorities List (NPL) and describes the implications of these factors for the demand for specific cleanup technologies. Because many Superfund sites have undergone detailed site assessments, much information is available on their characteristics. In addition, to the extent that Superfund sites are similar to those in other cleanup programs, the remediation technologies demanded for the Superfund program are likely to reflect needs in other programs.

This chapter is closely related to the previous chapter, which describes historical trends in the selection of technologies and their implementation at Superfund sites, the statutes that authorize the Superfund program, the history of the program, and the process used to manage Superfund sites. While Chapter 2 addresses Superfund sites for which remedies have been selected and documented in Records of Decision (RODs), Chapter 3 focuses primarily on the characteristics and potential remediation technologies for sites for which remedies have *not* been selected.

3.1 Factors Affecting Demand for Cleanup

Many technical, economic, public policy, and legal factors have combined to determine the number of sites currently included in the Superfund program, the cleanup standards and technologies to be used, and work schedule. Because Superfund is facing reauthorization, it is likely that legislative, budgetary, and regulatory changes will occur during the next few years. Some factors that could alter the scope of the cleanup effort, as well as the technologies to be used, are described below.

- EPA has added few sites to the NPL in recent years, and currently does not plan to change this policy. In addition, EPA has been emphasizing the completion of remedial designs and cleanup actions at sites already listed, and is spending somewhat less effort on the conduct of remedial investigations and feasibility studies (RI/FSs). The rate of addition of new sites also may be influenced by Congress through the EPA budget process and the forthcoming reauthorization of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

- In planning and implementing its cleanup programs, EPA coordinates extensively with various EPA offices, potentially responsible parties (PRPs), state and planning authorities, and local communities. These requirements may influence the sequence of work and types of technologies selected for a site.

- Federal, state, and PRP funding for Superfund site cleanups may fluctuate in the future. For Superfund remedial actions, the states contribute 50 percent of the construction and operation costs where they own the site and 10 percent of operations and maintenance (O&M) costs for all Superfund actions in their state. Also, PRP contributions to site remediation may be affected by business conditions and EPA's enforcement program activities.

- Changes to the Superfund process proposed in Congress over the past several years, as well as EPA administrative reforms, could significantly impact the total amount and schedule of remediation work required, and the types of technologies to be used. Some of the proposals are listed below:

  — Change the federal and state cleanup standards that apply. For example, proposed legislative changes may reinforce existing EPA administrative reforms to consider future land use in setting cleanup goals.

— Emphasize the treatment and disposal of only the highly toxic or highly mobile contamination at a site. In this proposal, other waste could be contained and the current preference for permanent remedies would be removed or reduced. Changes to the mandate for permanent remedies could cause changes in the types of treatment technologies used.

— Change the liability aspect of CERCLA to reduce the cost and time needed to assign the liability for a cleanup project. This proposal would reinforce and build upon initiatives under EPA administrative reforms. If PRP liabilities are reduced, more funds may be needed from the Superfund or other federal programs, thereby creating additional competition for limited federal funds. Nevertheless, because of the expected reduction in litigation, site cleanup decisions may occur more quickly.

— Limit the addition of new sites to the NPL. This proposal may reduce the size of the future federal Superfund cleanup market and cause some sites to be transferred to other federal and state programs. Although some sites not listed on the NPL are addressed under other programs, others may be addressed only minimally. In addition, the emphasis placed on innovative technologies by state programs varies. As described in Chapters 6 through 9 of this report, state and other federal cleanup actions are significantly affected by current budget conditions.

3.2 Number of Sites

The market for cleanup at NPL sites includes those sites where remedial action (RA) is scheduled, but has not yet begun. Remedial action is the phase of cleanup that typically involves construction, and in some cases operation, of the remedial technology. As of September 30, 1996, 547 proposed and final NPL sites not owned by the federal government still required at least one further remedial action.[1] The location of these sites is shown in Exhibit 3-1. An additional 124 NPL sites located at federal facilities require one or more RAs. Federal facilities on the NPL are included in the market estimates provided in Chapters 6, 7, and 8.

For some of the 547 sites EPA has identified more than one operable unit (OU) or part of the site for which an RA is planned; the total number of OUs with planned RAs is 726. Over one-third of these OUs are undergoing remedial investigations and feasibility studies (RI/FSs), and still awaiting the selection of remedial technologies (Exhibit 3-2). For 53 percent, remedies have been selected, but not implemented (*i.e,*. RA has not begun). Although the specific technologies selected are not included in this report, Chapter 2 enumerates the treatment technologies selected through fiscal year (FY) 1995 and provides references for additional site-specific information. Appendix Exhibit A-5 lists the names of the sites, OU number, state, EPA identification number, and phase of the project.

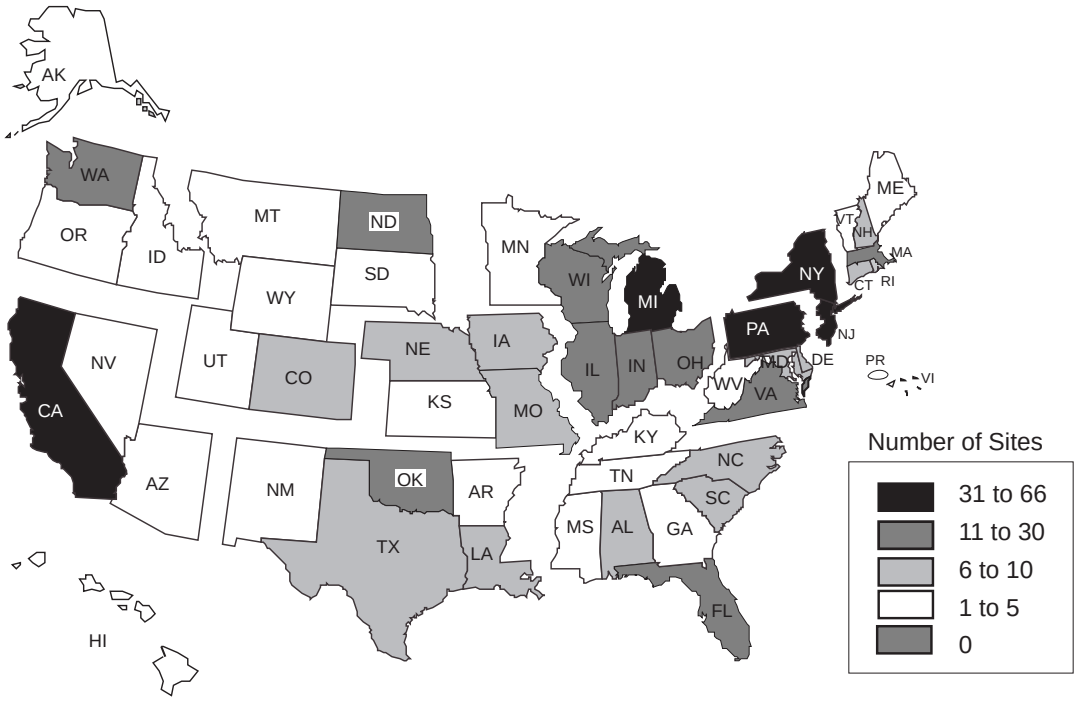
Cleanup contractors for EPA-lead sites typically are selected after the remedial design (RD) has been completed. For PRP-lead sites, some PRPs select a vendor to conduct both the RD and RA. EPA estimates that PRPs will conduct RDs and RAs at about 70 percent of the 547 sites.

This report does not estimate the smaller market for remediation technologies in the Superfund removal program. As of the end of FY 1996, the EPA had conducted removal actions at 3,450 sites, over 80 percent of which are not currently NPL sites.[2] It is difficult, however, to predict the number, type, and timing of the cleanup of these sites. Removals are usually limited to one year and $2 million, and historically have relied less on innovative technologies than have longer term remedial actions. The innovative technologies addressed in this report have been used 32 times in 27 removal actions.[3]

Future NPL Sites

The estimate of the future NPL market in this report does not include future listings on the NPL, which also represent a market for remediation technologies. The number of sites that eventually will be listed is uncertain and may depend upon forthcoming legislation to reauthorize CERCLA. Between 1993 and July 1996, the Agency listed a total of 120 sites, or an average of 30 per year. The characteristics of NPL

Exhibit 3-1: Location of NPL Sites with Planned Remedial Actions



Note: Includes 547 proposed and final National Priority List (NPL) sites not owned by the federal government.
Source: U.S. EPA, Office of Emergency and Remedial Response, CERCLA Information System, September 30, 1996.

sites vary with the basis for listing and when the listing occurs. The three basic mechanisms for adding sites to the NPL are the following:

- Each state may nominate a total of one site without regard to its Hazard Ranking System (HRS) score;
- The Agency may propose for listing sites recommended by the Agency for Toxic Substances and Disease Registry; and
- A site may be evaluated with the HRS, and if the score is above 28.5, that score could be used to support adding that site to the NPL.

This third mechanism is the primary tool used to add sites. Most of the sites currently listed on the NPL were ranked under the original HRS, which emphasized exposure to contaminated groundwater. The revised HRS also considers soil and sediment exposure and additional pathways.[4]

Exhibit 3-2: Phase of Remediation of Operable Units at Non-Federal NPL Sites with Planned Remedial Actions

Remedial Assessment Not Begun	Study Under Way	Remedy Selected	Design Under Way	Total Operable Units
76	263	87	300	726

Note: Total sites equals 547; each site may contain more than one operable unit.

Source: U.S. EPA, Office of Emergency and Remedial Response, CERCLA Information System, September 30, 1996.

Potential for Innovative Technology Use

Using trends from past years, EPA estimates that about 15 percent of remedial actions for which EPA has not selected remedies will incorporate at least one innovative technology. About 15 percent of all RODs signed between FY 1990 and FY 1995 included at least one innovative technology, primarily for source control (*e.g.*, treatment of soil). This percentage has varied widely from year-to-year, from six percent to 32 percent. This percentage is greater if only source control RODs are considered (Exhibit 2-4). In FY 1995, 22 percent of source control RODs included an innovative technology.

3.3 Site Characteristics

This section describes how frequently certain waste matrices and contaminants are being remediated at NPL sites. This information can be used to estimate the potential to use certain remedial technologies at NPL sites where RAs are planned.

The analysis is based on a study of sites with past RODs. Out of 994 NPL sites with RODs as of the end of FY 1994, data on contaminants and contaminated matrices are available for 944 sites.[5] Data are not available for the other 50 sites with RODs, many of which had "No Action" RODs which did not call for remediation. Because these 944 sites represent 70 percent of the 1,355 sites ever listed or proposed for listing on the NPL as of the end of FY 1994, EPA believes that their characteristics are representative of those of other NPL sites.

Exhibit 3-1 presents the geographical location of the 547 NPL sites for which future RAs are planned. The data reflect the industrialized nature of these regions and the number of abandoned industrial and commercial facilities. New Jersey, Pennsylvania, New York, California, and Michigan alone account for approximately 44 percent of these NPL sites.

3.3.1 Types of Contaminated Matrices

Exhibit 3-3 shows the percentage of NPL sites remediated for various contaminated matrices: 76 percent of sites require remediation of groundwater, 72 percent of soil, 22 percent of sediments, and 12 percent sludge. Because too few sites with RODs contain data on other types of wastes, such as waste piles, mine tailings, and liquid wastes, a meaningful analysis for those types of wastes could not be done.

3.3.2 Types of Contaminants

Sites with RODs were analyzed for the presence of three major contaminant groups: volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals. These broad groups of contaminants were further divided into more specific treatability subgroups (discussed below) that better coincide with the application of certain technologies, such as bioremediation. The 12 most frequently occurring contaminants also are identified. Appendix Exhibit A-2 lists common chemicals in each group. With the exception of polychlorinated biphenyls (PCBs) and pesticides, which are grouped with SVOCs, chemicals and elements are grouped in accordance with EPA test methods for evaluating solid waste.[6]

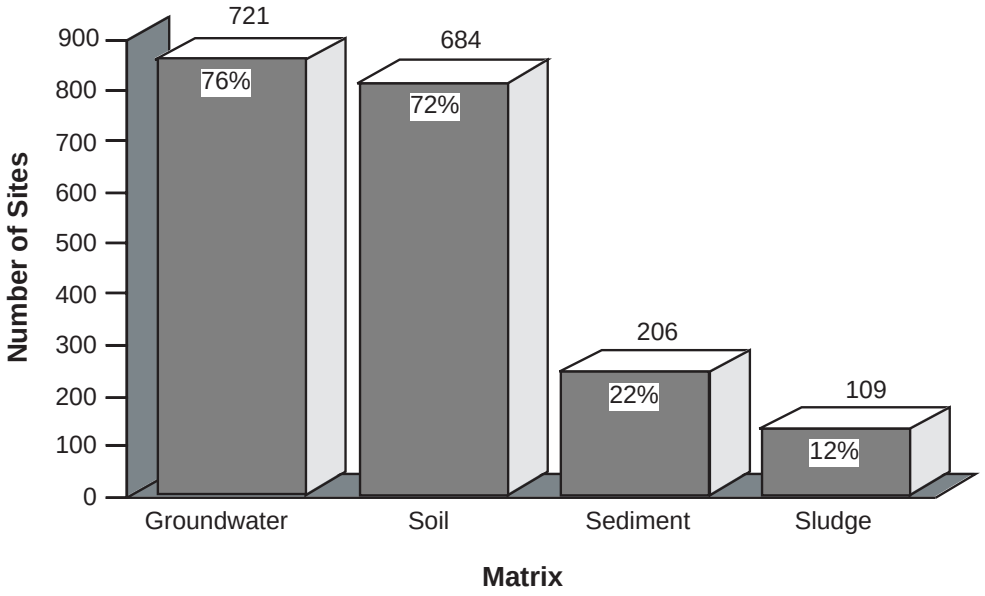
Major Contaminant Groups

Exhibit 3-4 presents the frequency of cleanup of the major contaminant groups. VOCs are to be remediated at 71 percent of sites, followed by metals (65 percent) and SVOCs (61 percent). For this analysis the occurrence of a contaminant group at a site is counted only once, whether or not it was found in more than one matrix. These data also indicate that the NPL sites tend to be complex: all three groups (VOCs, SVOCs, and metals) are to be remediated at 41 percent of the sites and two groups are to be remediated at 25 percent of the sites, but not necessarily in the same matrix. The sites listed as "others" only contain contaminants described as radioactive elements, non-metallic inorganics such as nitric oxides, explosives and asbestos, or unspecified organics or inorganics.

Subgroups of Volatile and Semivolatile Organics

Two of the major contaminant groups, VOCs and SVOCs, were subdivided into more specific treatability subgroups that better coincide with the application of certain technologies, such as bioremediation. Exhibit 3-5 shows the frequency

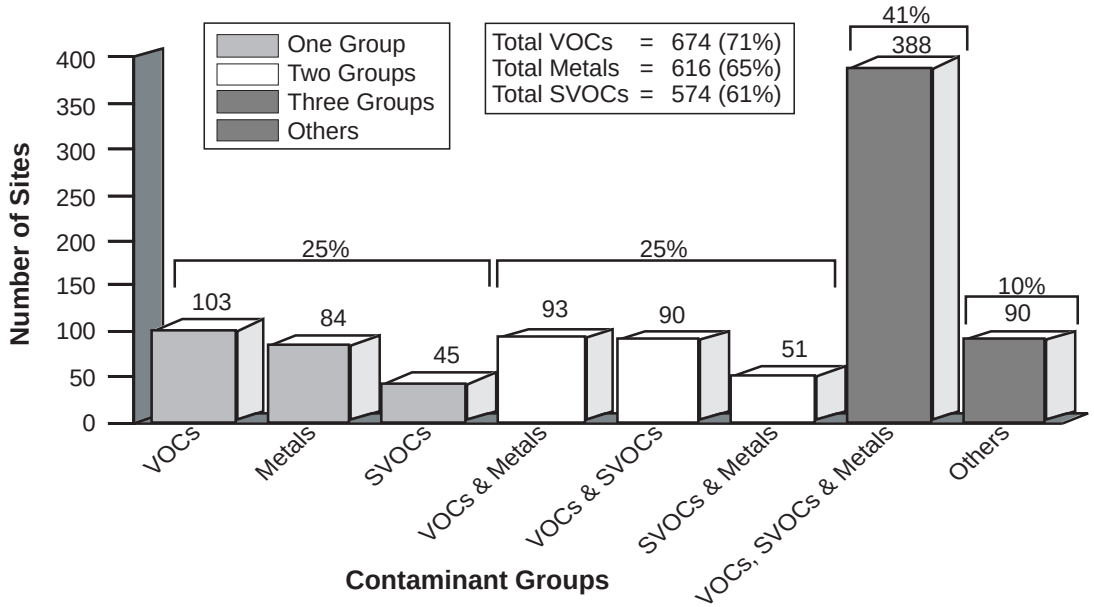
Exhibit 3-3: Frequencies of Contaminated Matrices at NPL Sites with RODs



Notes: Based on data available for 944 National Priorities List sites with fiscal year 1982-1994 Records of Decision (RODs). A site may contain more than one contaminated matrix.

Source: U.S. EPA, Office of Emergency and Remedial Response, ROD Information Directory, December 1995.

Exhibit 3-4: Frequencies of Major Contaminant Groups at NPL Sites with RODs

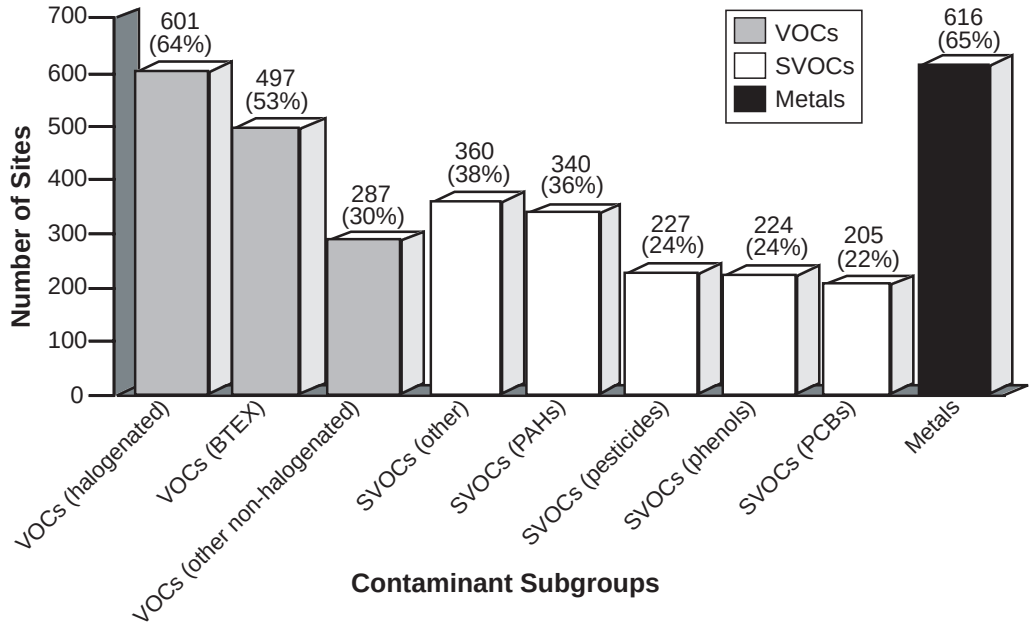


Notes: Based on data available for 944 National Priorities List sites with fiscal year 1982-1994 Records of Decision (RODs). Percentages do not total to 100 due to rounding.

The 90 sites listed as “others” contain only radioactive elements, non-metallic inorganics, or unspecified organics or inorganics.

Source: U.S. EPA, Office of Emergency and Remedial Response, ROD Information Directory, December 1995.

Exhibit 3-5: Frequencies of Major Contaminant Subgroups at NPL Sites with RODs



Notes: Based on data available for 944 National Priorities List sites with fiscal year 1982-1994 Records of Decision (RODs). Contaminant information for 90 of the sites with data does not fall into these subgroups. A site may contain one or more of the nine contaminant subgroups.

Source: U.S. EPA, Office of Emergency and Remedial Response, ROD Information Directory, December 1995.

of cleanup of these subgroups as well as the metals group. The subgroups are described below, grouped according to the three major contaminant groups:

- VOCs include: halogenated, BTEX (benzene, toluene, ethylbenzene, xylene), and other non-halogenated VOCs (ketones and alcohols). The most prevalent class of organics, halogenated VOCs, which are widely used as solvents, are being remediated at 601 (64 percent) of the sites. With regard to BTEX, although many of these compounds result from petroleum products, CERCLA prohibits listing sites on the NPL that are contaminated with petroleum products alone.

- SVOCs include: polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), pesticides, phenols (including pentachlorophenol), and other SVOCs, which include chlorobenzene and phthalates. The most common SVOCs are PAHs and pesticides, to be addressed at 36 percent and 24 percent of sites, respectively.

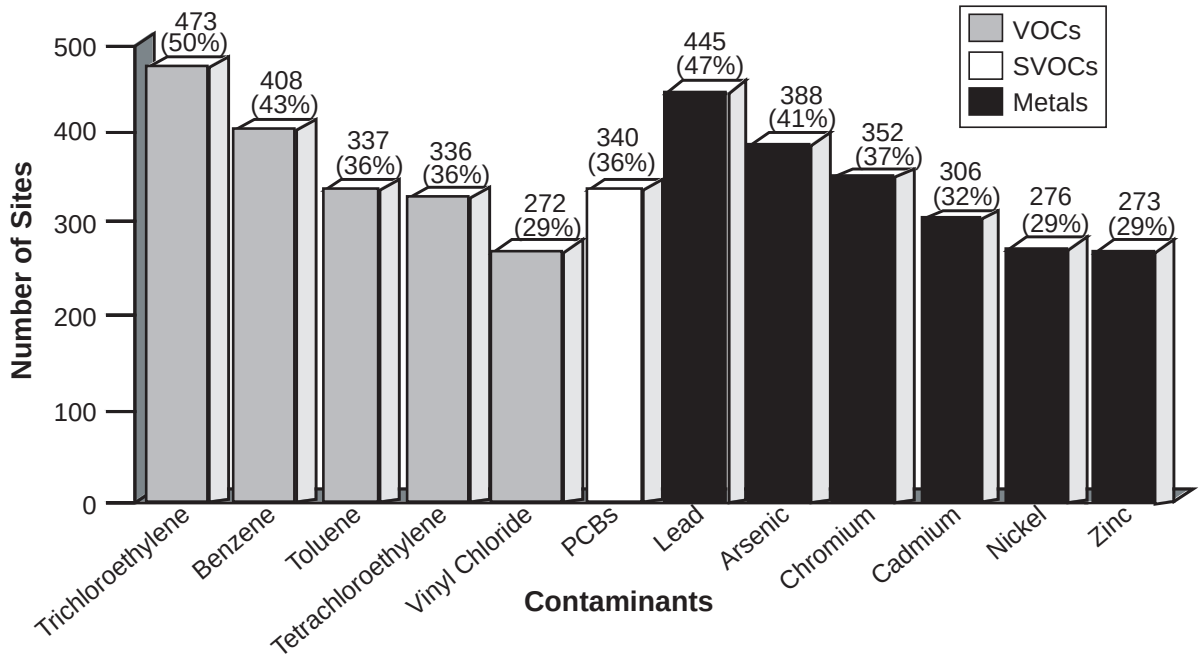
- Metals include: lead, arsenic, chromium, cadmium, zinc, nickel, and other less frequently found metals.

For this analysis, each subgroup was counted only once per site, regardless of whether it occurred alone, with other types of contaminants, or in more than one matrix. Because more than one contaminant subgroup can be present at a site, the total number of occurrences is greater than the total number of sites.

Most Common Individual Contaminants

Exhibit 3-6 shows the 12 contaminants most commonly found to need remediation at NPL sites. The list contains five VOCs, six metals, and one SVOC. Again, a contaminant is only counted once for each site, even if it occurs in more than one matrix; and more than one contaminant can occur per site.

Exhibit 3-6: Frequencies of the Most Common Contaminants at NPL Sites with RODs



Notes: Based on data available for 944 National Priorities List sites with fiscal year 1982-1994 Records of Decision (RODs). A site may contain one or more of these contaminants.

Source: U.S. EPA, Office of Emergency and Remedial Response, ROD Information Directory, December 1995.

3.3.3 Estimated Quantities of Contaminated Material

The market also can be described in terms of the quantity of contaminated material to be remediated. Fewer RODs contain quantity data than the number that contain contaminant and matrix information. The RODs for 42 percent of the 994 sites with RODs contain information on the quantities of soil, sludge, or sediment to be remediated using any method (*i.e.*, treatment, containment, or off-site disposal). The data from these sites are used to characterize the quantities of material requiring some type of remediation.

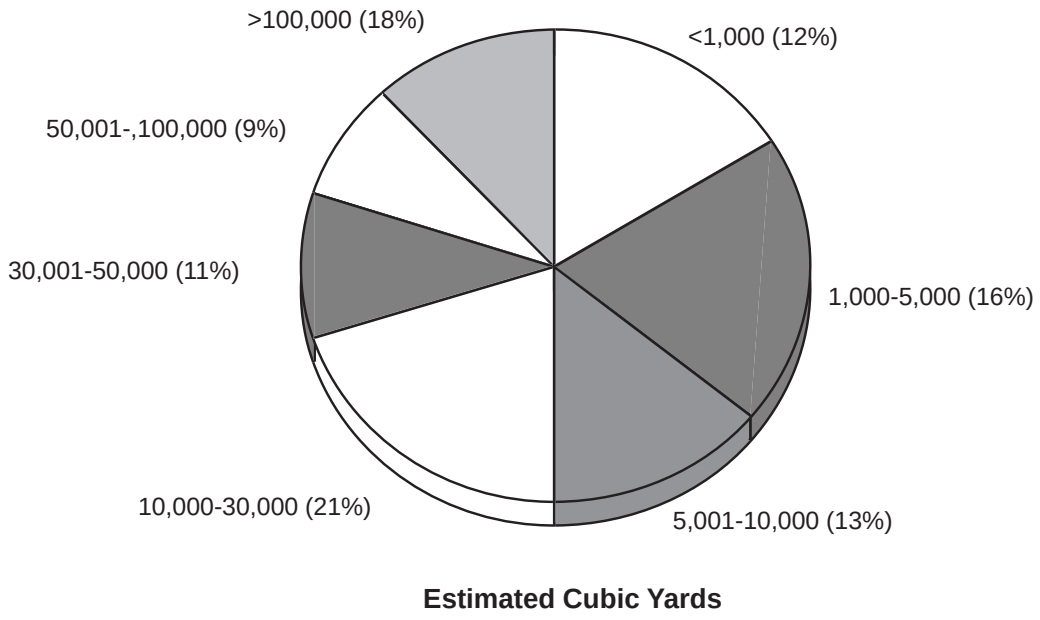
Distribution of Quantities

Exhibit 3-7 presents the distribution of the total quantities per site of contaminated soil, sediment, and sludge requiring remediation. Based on these estimates, approximately 40 percent of the sites are expected to contain 10,000 or fewer cubic yards, and only 18 percent of the sites are expected to contain 100,000 or more cubic yards of contaminated material. These data indicate an appreciable market for technologies that can effectively treat small quantities of contaminated media. These data include all available data on material to be treated, contained, or disposed. However, because reviews of RODs indicate that quantities of waste to be capped often are not documented in the ROD, the proportion of sites that contain large quantities of wastes may be greater than the data indicate. The quantity distributions for soil, sediment, and sludge, which are shown in Appendix Exhibit A-3, indicate that about 90 percent of the sites with data involve contaminated soil to be remediated.

Quantities by Major Contaminant Group

The quantities of contaminated material (soil, sediment, and sludge) at the 547 non-federal NPL sites with planned RAs were estimated for the three major contaminant groups (*i.e.*, VOCs, SVOCs, and metals) from estimates contained in the RODs for sites containing similar contaminants. The average quantity for each contaminant group at the sites with ROD data was multiplied by the estimated number of sites

Exhibit 3-7: Distribution of Total Quantities of Contaminated Soil, Sediment, and Sludge at Selected NPL Sites with RODs



Notes: Based on data available for 944 National Priorities List sites with fiscal year 1982-1994 Records of Decision (RODs). See Appendix Exhibit A-3 for supporting data.

Source: U.S. EPA, Office of Emergency and Remedial Response, ROD Information Directory, December 1995.

that contain the same contaminant groups based on the percentages in Exhibit 3-4. Statistical outliers were not included in the calculation.

Exhibit 3-8 indicates the estimated quantities of contaminated materials at NPL sites by contaminant group. An estimated 33 million cubic yards of soil, sludge, and sediment are to be remediated at the sites. Much of this material, 24 million cubic yards, is accounted for by materials contaminated by metals, alone and in combination with other contaminants. VOCs, alone and combined with other contaminants, total 23 million cubic yards; and SVOCs total 21 million cubic yards.

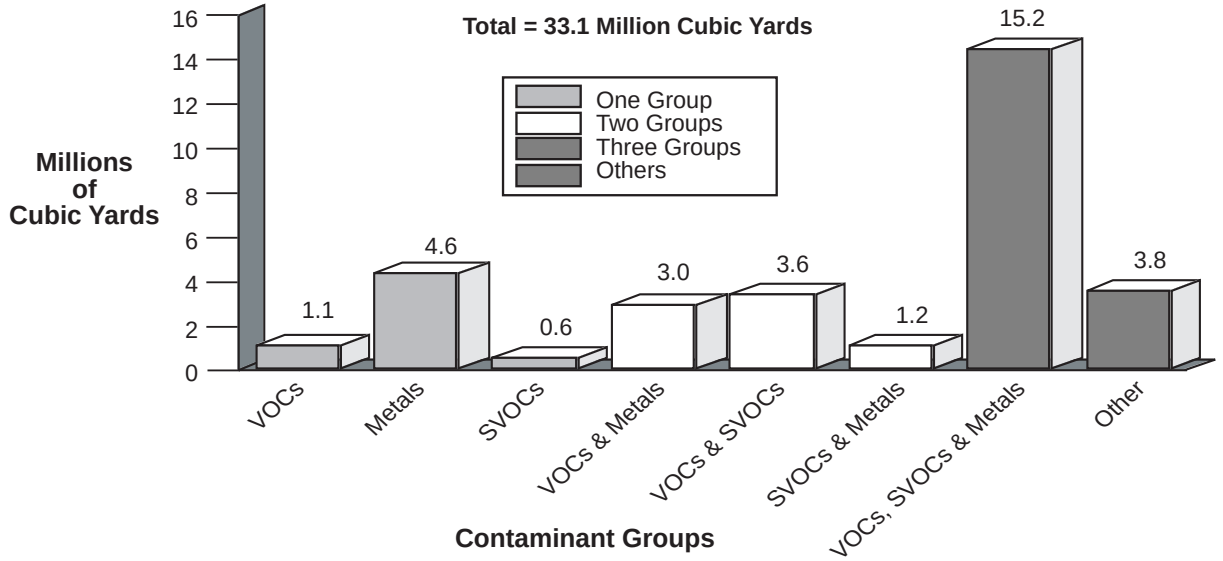
In developing these estimates, it was assumed that all of the contaminated material at a site contained the contaminant groups present. The average site quantities by contaminant group varied from a low of 19,000 cubic yards for VOCs alone to a high of 93,000 cubic yards for metals alone. The details of the calculations are shown in Appendix Exhibit A-4.

3.4 Estimated Cleanup Costs

EPA has estimated the value of the market for 746 OUs at the 547 non-federal facility NPL sites with planned RAs. The estimated total RA cost for non-federal Superfund sites that have not begun RA is $6.7 billion in 1996 dollars. This estimate does not include costs for federal facility NPL sites, which are described in Chapters 6 through 8. The NPL site cost estimate also does not include costs for site assessments and studies, designs, operation and maintenance, long-term response actions, removals, site management, administrative costs such as payrolls, other federal agency support, oversight of potentially responsible party (PRP)-lead cleanups, and enforcement activities. This estimate is based on the following assumptions:

- EPA assumes that PRPs will be responsible for at least 70 percent of future RA starts. Seventy percent of the 746 OUs yields 522 PRP-lead OUs: the remaining 224 OUs are fund- or state-lead.

Exhibit 3-8: Estimated Quantity of Contaminated Soil, Sediment, and Sludge by Major Contaminant Groups at NPL Sites with Planned Remedial Actions



Notes: These estimates are the quantities for 547 non-federal NPL sites that require remedial action. A site is counted only once. These values are derived from estimates in fiscal year 1982-1994 Records of Decision (RODs) for 420 sites containing similar contaminants. See Appendix Exhibit A-4 for supporting calculations.

"Other" includes 52 sites that contain only radioactive elements, non-metallic inorganics, or unspecified organics or inorganics.

Source: U.S. EPA, Office of Emergency and Remedial Response, ROD Information Directory, December 1995.

- Based on a study sponsored by DOE, the costs of cleaning up PRP-lead sites are about 15 percent less than those of fund-lead sites, on average.[7] These costs include site investigations, design, and construction.

- For fund-lead sites, the average RA cost is $10 million per OU.[8] Using the previous assumption, the RA cost for a PRP-lead OU will average $8.5 million ($10.0 million minus 15 percent). RA cost includes work conducted by the cleanup contractors, oversight by EPA, and initial operation and maintenance costs.

Multiplying the above figures (224 OUs X $10 million + 522 X $8.5 million) results in the $6.7 billion total costs for both Fund-lead and PRP-lead sites noted above.

Another indication of the amount of cleanup effort needed is the size of the EPA Superfund budget. Congress allocated $1.4 billion for FY 1997. These funds are allocated for direct and indirect site activities, oversight of PRP activities, research and development, and program support. The EPA budget does not include costs incurred by PRPs, states, or other federal agencies.

3.5 Market Entry Considerations

Technology decisions for Superfund sites are based on the specific information available for each site and the state-of-the-art of the available technologies. Information on new technologies is particularly critical at two points in the decision-making process: during remedy selection, and during remedy design and procurement. Technology vendors must be aware of the information sources used as well as how site managers consider their options during these two cleanup phases.

3.5.1 Market Considerations During Remedy Selection

The Superfund RI/FS process is an integrated, phased approach to characterizing the site risks and evaluating remedial alternatives. Early in the RI/FS stage, technologies are identified and screened with respect to technical

implementability, effectiveness, and relative cost. To ensure that Superfund site managers and consulting engineers consider a given technology, it is important to make them aware of the technology at this early stage. During the final technology evaluation, later in the RI/FS, technologies are compared and evaluated using the nine evaluation criteria specified in the National Contingency Plan (NCP). Information on technology performance and cost is particularly important during this final evaluation. EPA and engineering consulting firms (who usually conduct the RI/FSs for EPA, states, and PRPs) use a variety of information sources, many of which are described in Section 3.5.4, to identify potential technologies. Since information for innovative technologies may be limited, treatability studies or on-site demonstrations may be used to assess cost and performance.

While Superfund policies encourage the selection and implementation of new technologies, the Superfund remedy selection process can present some hurdles for innovative technology vendors:

- Information on many innovative technologies is limited. Superfund site managers and consulting engineers may not have as much information on the performance and cost of an innovative technology as for an established technology. The Agency and others have developed reports and databases to disseminate information about remedial technologies. Nonetheless, Superfund site managers may have difficulty comparing the merits of an innovative and a conventional technology if they do not have information on a technology's cost, implementability, short- and long-term effectiveness, and ability to reduce the toxicity, volume, or mobility of the contaminants.

- Treatability studies and on-site demonstrations may be impractical. The NCP and EPA policy encourage the use of bench- or pilot-scale treatability studies, when appropriate and practical.[4] Furthermore, EPA policy stipulates that: *promising new technologies should not be eliminated from consideration solely because of uncertainties in their performance and cost, particularly when timely treatability study could resolve those uncertainties.*[9] In reality, the funding and schedule for site cleanup, as well as contracting and regulatory impediments, may preclude the use of studies and demonstrations.

- The RI/FS contractor may be prohibited from bidding on the RA. Also, for EPA- and state-lead sites, the remedial design contractor at a site usually does not conduct the remedial action. A technology vendor that also provides RI/FS services should determine the relative value of the two opportunities before deciding which service to provide.

To make their capabilities more widely known, technology vendors should consider participating in the programs cited in Section 3.5.4, and contacting remedial project managers (RPMs) and consulting engineers. A vendor who is interested in a particular NPL site, may contact the assigned EPA RPM for more information. The appropriate EPA regional office, listed in Appendix E, can provide the identity of the RPM for a specific site. Also, information on specific technologies may be provided to consulting engineers for their consideration in the analysis of cleanup options. Consulting engineers include firms under the Alternative Remedial Contracting Strategy (ARCS) or Remedial Action Contracting Strategy (RACS) to conduct RI/FSs. A current list of regional service contracts also is provided in Appendix E. The Agency expects to award additional RAC contracts in the future.

3.5.2 Market Considerations During Design and Procurement

Once a remedy has been selected and documented in a ROD, the project enters the design process, where the details of the cleanup, such as waste quantities and performance standards, are more clearly defined. At this stage, federal and state agencies can make use of technology information for preparing requests for proposals and evaluating bids.

All Superfund sites requiring cleanup for which EPA has the lead currently are funded by one of the following mechanisms:

- Remedial Action Contracting Strategy (RACS) and Alternative Remedial Contracting Strategy (ARCS): EPA contracts with

architecture/engineering (A/E) firms for the remedial program.

- Emergency Remedial Contracting Strategy (ERCS): EPA contracts with A/E firms for the removal program.

- Interagency Agreements (IAGs): EPA enters into agreements with the U.S. Army Corps of Engineers, Bureau of Reclamation, or other federal agencies.

- Cooperative Agreements (CAs): EPA enters into agreements with states, political subdivisions, or Native American Tribes.

As previously stated, a list of regional service contracts is included in Appendix E.

The three most definitive sources of information on selected remedies for sites entering RD and RA are the ROD, the *ROD Annual Report*,[10] the ROD CD-ROM, [11] and the *Innovative Technologies: Annual Status Report Database (ITT Database)*.[12] The ROD and the *ROD Annual Report* provide detailed information on the site contaminants and risks posed, the selected remedy, estimated costs, and associated cleanup levels. The latest publication of the *ROD Annual Report* is for FY 1992. The RODs on disk and paper copies are available through the Superfund automated phone request line (800-775-5037 or 202-260-8321) For innovative treatment and selected established technologies, the *ITT Database* provides more current summary information on the contaminants and media to be remediated, anticipated or actual cleanup schedule, and expected site lead (EPA, state, PRP).

A vendor may use these publications to identify opportunities. Vendors also may provide cost, performance, and availability information to the EPA RPM or state site manager and the site remedial design firm or agency. Vendors can enhance their responsiveness to requests for proposals (RFPs) for site remedial actions by keeping abreast of site activities. Once an RFP has been issued, the award of a contract may take weeks or months.

3.5.3 Research and Development

Recent cuts in funding have reduced the number and scope of research, development, and demonstration programs conducted by federal agencies, particularly those at EPA. Some opportunities still exist for vendors who want to work cooperatively with EPA, and the Departments of Defense (DOD) and Energy (DOE). In many cases the programs involve other industry partners as well. Some of the more important efforts include the Superfund Innovative Technology Evaluation (SITE) program, the Remediation Technologies Development Forum (RTDF), and the Clean Sites Public-Private Partnerships project. These programs involve on-site demonstration projects. The three are discussed in Section 2.5. Section 3.5.4 describes how to access SITE program reports and other published information. In addition, there is a coordinated effort by federal agencies to document the cost and performance results of completed remediation projects.

3.5.4 Disseminating Innovative Technology Information

Several sources of information on innovative and established treatment technologies have been developed to help potential technology users identify and evaluate cleanup alternatives and technology vendors. Some of the primary resources of importance to both technology users and suppliers are listed below. Most of these resources are available for downloading from the Clean-Up Information System (CLU-IN) via internet (http://www.clu-in.com) or modem (301-589-8366). Voice help is available at 301-589-8368. The sources listed below also may be available from EPA's National Center for Environmental Publications and Information (NCEPI) voice (800-490-9198 or 513-489-8190), or fax (513-489-8695).

- *Bioremediation in the Field Search System (BFSS)*.[13] BFSS is a computer database of information on over 400 waste sites across the U.S. where bioremediation is being tested or implemented, or has been completed. It is available for downloading from CLU-IN. To provide data for input into the next system update, vendors may call 617-674-7329, or fax: 617-674-2851.

- *Vendor Information System on Innovative Treatment Technologies (VISITT)*.[14] This computer database allows users to quickly

screen innovative technologies for particular applications. The EPA's Technology Innovation Office (TIO) released the latest version in August 1996, and updates the system annually. Version 5.0 contains current vendor-supplied information on 346 innovative treatment technologies to treat soil, both above ground and in place, groundwater *in situ*, and off-gas generated by innovative treatment systems. The information provided on each method includes contaminants and matrices treated, performance data, and project experience. VISITT is available from CLU-IN and NCEPI. Information on how to be included in VISITT is available from the VISITT/VendorFACTS Hotline at 800-245-4505 or 703-883-8448, or on the internet at http://www.prcemi.com/visitt.

- *Vendor Field Analytical and Characterization Technologies System (VendorFACTS).*[15] VendorFACTS is a computer database that provides information on innovative technologies used to measure or monitor hazardous contaminants at contaminated sites. The 128 technologies in the system address air, water, and soil. VendorFACTS is available from CLU-IN and NCEPI. Information on how to be included in VendorFACTS is available from the VISITT/VendorFACTS Hotline (see above). TIO released the second version of the database in March 1997.

- *Groundwater Remediation Technologies Analysis Center (GWRTAC).* In 1995, EPA established GWRTAC at the National Environmental Technologies Applications Center (NETAC) in association with the University of Pittsburgh. This center develops and disseminates information on current research development and demonstration efforts related to *in situ* groundwater technologies. The Center also analyzes trends in technology development. GWRTAC operates a homepage at http://www.gwrtac.org.

- *Superfund Innovative Technology Evaluation (SITE) Program*. Under this program, which is described in Section 3.5.3, EPA provides reports on completed SITE evaluations. The *SITE Profiles* describes each project and lists available reports.[16] The document may be ordered from the ORD publications office (513-569-7562) or viewed on the internet at http://www.epa.gov/ORD/SITE. Information on how to participate in the program is available from EPA's National Risk Management Research Laboratory at 513-569-7696.

- Technical Guidance. EPA, often jointly with other organizations, develops guidance on specific types of innovative technologies. A list of selected references on innovative technologies is found in *Bibliography for Innovative Site Cleanup Technologies,* available from CLU-IN or NCEPI.[17]

Since these sources are often used in the preparation of lists of cleanup alternatives or bid documents, it is important that technology vendors and developers ensure that information on their products and services are represented. In addition, joining and participating in activities of various professional societies and trade groups may help a vendor promote specific capabilities.

3.6 References

1. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, *Annual FY 1996 Superfund Management Reports*, February 1997, Draft.

2. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, CERCLA Information System (CERCLIS), 1996.

3. U.S. Environmental protection Agency, Office of Solid Waste and Emergency Response, Technology Innovation Office, *Innovative Treatment Technologies: Annual Status Report (Eighth Edition)*, EPA-542-R-96-010, November 1996.

4. U.S. Environmental Protection Agency, "Hazard Ranking System; Final Rule," 55 *Federal Register* 51532, Vol 55, No. 241, Part II, December 14, 1990.

5. U.S. Environmental Protection Agency, Office Emergency and Remedial Response, *Record of Decision Information Directory*, 1995.

6. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," Third Edition, Proposal Update II*, PB94-170321, November 1992.

7. U.S. Department of Energy, Office of Environmental Restoration and Waste Management, *Project Performance Study Update April 1996*, prepared by Independent Project Analysis, Inc., 1996.

8. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, *The Facts Speak for Themselves: A Fundamentally Different Superfund Program*, November 1996.

9. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, *Initiatives to Promote Innovative Technology in Waste Management*, OSWER Directive 9380.0-25, April 29, 1996.

10. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, *ROD Annual Report FY 1992*, PB93-963349, December 1993.

11. U. S. Environmental Protection Agency, Office of Emergency and Remedial Response, *Records of Decision (RODs), 1982-1994*, (on CD-ROM), PB96-593551.

12. U.S. Environmental protection Agency, EPA, Office of Solid Waste and Emergency Response, Technology Innovation Office, *Innovative Treatment Technologies: Annual Status Report Database*, EPA-542-C-95-002, September 1995.

13. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, *Bioremediation in the Field Search System (BFSS)*, EPA-540-R-95-508B, 1995.

14. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, *Vendor Information System for Innovative Treatment Technologies*, Version 5.0, EPA-542-C-96-003, 1996.

15. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Technology Innovation Office, *Vendor Field Analytical & Characterization Technologies System (VendorFACTS)*, Version 2, EPA-542-C-97-001, March 1997.

16. U.S. Environmental Protection Agency, Office of Research and Development, *Superfund Innovative Technology Evaluation (SITE) Program Profiles*, Ninth Edition, EPA/540/R-97/502, December 1996.

17. U.S. Environmental Protection Agency, Office Solid Waste and Emergency Response, Technology Innovation Office, *Bibliography for Innovative Site Clean-Up Technologies*, EPA-542-B-96-003, August 1996.

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